Idaho State Department of Agriculture

Hog Creek, Scott Creek, Jenkins Creek and Warm Spring Creek Water Quality Monitoring Report April 1999 through March 2000 Weiser Flat, Weiser Idaho Prepared for Weiser River Soil Conservation District and Weiser River Watershed Advisory Group

---

Prepared By:
Kirk Campbell
Idaho State Department of Agriculture
Division of Agricultural Resources

In Cooperation with:
Idaho Soil Conservation Commission
The National Resource Conservation Service
Weiser River Soil Conservation District
Weiser River Watershed Advisory Group

ISDA Surface Water Program
Technical Results Summary #W-2
Boise, Idaho
January 2001

Introduction

The Idaho State Department of Agriculture (ISDA) is receiving state funding to help support the Soil Conservation Commission (SCC) and the local Soil Conservation Districts (SCDs) with the implementation phase of the Total Maximum Daily Load (TMDL) process. ISDA will support the SCC and SCDs through various water quality monitoring programs. These monitoring programs will help assist in understanding the source and transport of contaminants from various agricultural practices. In addition, the information gathered in these studies will help fill data gaps, help with pollutant load allocations and ensure that BMPs are established in areas of need and are functioning properly for pollutant reduction.

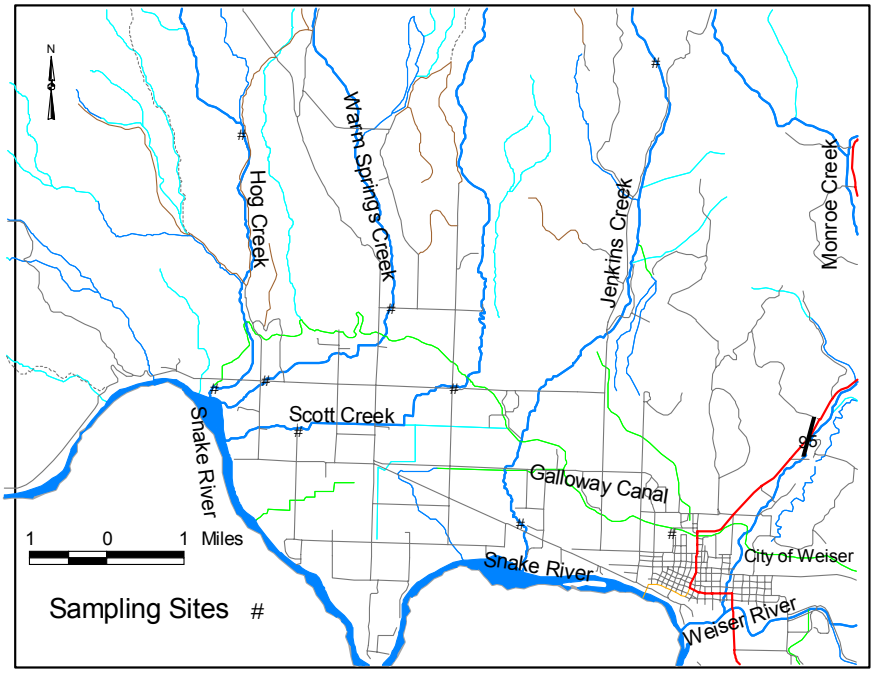

Figure 1. Weiser Flat Site Map

Background

Three 303(d) listed creeks are located within an area known as Weiser Flats, located just west of the town of Weiser, Idaho (Figure 1). The three creeks; Hog Creek , Warm Springs Creek and Scott Creek are scheduled for TMDLs in the year 2001. A fourth creek, Jenkins, was added to the monitoring program for evaluation. The above mentioned 303(d) creeks are listed as having excessive sediment and nutrients impacting their beneficial uses. The four creeks confluence with the Snake River and reside in the Snake River/Brownlee Reservoir hydrological unit code (HUC) 17050201.

The Weiser Flat area is dominated by agricultural activities. All creeks originate in areas of higher elevation and flow south through irrigated row crop areas prior to entering the Snake River. Little historical water quality data is available for any of these subwatersheds. With the dominant agricultural activities and the lack of historical data, this is a good area to institute a water quality-monitoring program. In addition to helping determine agricultural impacts, this new data can be used for BMP implementation and by the Idaho Department of Environmental Quality (IDEQ) to accurately allocate pollutant loadings for the TMDL process.

On March 3, 1999 personnel from the National Resource Conservation Service (NRCS), ISDA and SCC conducted a preliminary site evaluation on all of the above mentioned creeks. On March 11, 1999 at the Weiser Technical Advisory Group (TAG) meeting, ISDA presented the proposed sampling program to the TAG mem-

bers. The TAG approved the proposal and voted to recommend this program to the newly formed Weiser River Watershed Advisory Group (WAG). ISDA presented the monitoring program to the Weiser WAG at its March 18, 1999 meeting. The WAG voted, overwhelmingly, to support the monitoring program.

Program Objectives

ISDA will work in cooperation with the NRCS, SCC, ISACD and IDEQ to complete the following objectives.

- Evaluate the water quality and discharge rates at various locations within each subwatersheds.
- Attempt to determine which areas contribute the greatest level of pollutant loading.
- Relate pollutant loading to areas that may require BMP implementation under the TMDL process.
- Use this data for public information and education

Monitoring Schedule and Site Descriptions

Monitoring was conducted on a bi-weekly schedule during the months of April through October 1999 and once a month during the late fall and winter months (November 1999 through March 2000).

Two monitoring stations were established on each of the four creeks. When possible background sites were established above the agricultural row crop areas to determine the contributions from the upper subwatersheds. The second group of stations were established below the row crop acreage prior to each creek entering the Snake River (Figure 1). At upper Scott Creek a site could not be established in the upper subwatershed and included some agricultural activity above the site. The actual site was located on the corner of Pringle and Olds Ferry Road (Figure 1). Scott Creek became stagnant during the months of September and October, 1999 and samples were not collected at this time. Hog Creek upstream station consisted primarily of Galloway Canal diversion water that entered Hog Creek just upstream of the established water quality station. Above the diversion inlet, Hog Creek had minimal flows (.12 to .13 ft^3 sec.) during the mid summer months and at times dried up during the late summer months. Water quality monitoring sites for Jenkins Creek and Warm Springs were established above any major agricultural activities. In addition to the eight (8) creek locations, one additional site was established on Galloway Canal. The Galloway site was established to evaluate the quality of water prior to entering the study area.

General Results

Although a TMDL has not been developed and submitted for the three listed creeks, pollutant reductions will probably be required prior to their confluence with the Snake River. Table 1 compares the average concentrations collected by ISDA to some literature values that have been proposed or used in TMDLs established in Idaho (Lower Boise TMDL 1998; USEPA 1987; Cline 1973).

Site	TSS mg/L	Total-P mg/L	Nitrate mg/L
TMDL proposed concentrations	**50**	**0.10**	**0.30**
Jenkins Up	6	.14	.41
Jenkins Down	184	.54	2.98
Scott Up	49	.21	3.67
Scott Down	120	.34	1.04
Hog Up	37	.15	.24
Hog Down	25	.19	.39
Warm Up	5	.17	.27
Warm Down	110	.27	.79

Table 1. Possible proposed TMDL concentrations and ISDA mean concentrations

Total Suspended Sediment

For the 1999 monitoring year the four creeks studied contributed an average of 31,274 lbs./ day of suspended sediment into the Snake River (Figure 2). From the data collected the load allocations were as follows: Scott Creek (10608 lbs./day), Jenkins Creek (9918 lbs./ day), Warm Springs Creek (9724 lbs./day) and Hog Creek (1024 lbs./day).

Hog Creek monitoring indicates the upstream section contributes more sediment than the downstream section. This is misleading because the sampling location was directly downstream from an irrigation water diversion. There was one sample collected above the diversion which more accurately represents the true background water quality of Hog Creek (Figures 2 and 3).

To look at possible reductions, the concentration level of 50 mg/L (Lower Boise River TMDL value) is compared to the actual measured concentrations collected during this study (Figure 3).

Using the Boise River's TMDL sediment concentration of 50 mg/L, the reductions required within the Weiser flats would be as follows: Jenkins Creek (~73%), Scott Creek (~58%), Warm Springs (~55%) and Hog Creek (0%). These reductions are based on the measured sediment concentration and discharge within the lower portions of each creek. For this study period, there would be no reduction in sediment load required within the upper subwatersheds above the uppermost monitoring sites.

Total Phosphorus

Total phosphorus loads and sediment loads will probably be the driving force for pollutant reductions within the Weiser Flats study area. The reductions will correlate directly with the required decreases set for the Snake River and the Hells Canyon Complex TMDL.

During the monitoring year, the four creeks (Warm Springs, Jenkins, Scott, and Hog) combined to deliver an average of 91 lbs. of total phosphorus to the Snake River daily. Approximately 30% (31 lbs./day) of the daily load consists of dissolved phosphorus.

Based on EPA criteria for phosphorus, concentrations for streams not discharging directly into Lakes or Reservoirs should not exceed 0.10 mg/L. Although the four creeks do not flow directly into Brownlee Reservoir, they do flow into the Snake River which enters Brownlee Reservoir. The possible allowable load of total phosphorus, for the Weiser Flats, could be set even lower based on the Lower Hells Canyon Complex TMDL.

For this report, and for comparison, the concentration of 0.10 mg/L will be used to compare possible load reductions needed for the creeks. The average phosphorus concentrations for the study year are as follows: Jenkins Down (.54 mg/L), Scott Down (.34 mg/L), Warm Springs Down (.27 mg/L), and Hog Down (0.19 mg/L). Galloway Canal which supplies irrigation water for the study area had an average phosphorus concentration of 0.15 mg/L. Figure 4 depicts the loads associated with each of the above four creeks. The high discharge rate from Galloway Canal accounts for its large load into the study area.

Using the discharge rates and average concentrations of phosphorus for each creek, reductions based on EPA's criteria of 0.10 mg/L would be as follows: Warm Springs Down (62%), Scott Down (70%), Hog Down (50%), and Jenkins Down (45%) (Figure 5). Depending on the criteria used, the actual TMDL required reductions may be higher or lower than the numbers sited in this report.

Nitrate + Nitrite as Nitrogen

Although nitrate+nitrite as nitrogen (NO_3+NO_2-N) is not one of the driving nutri-

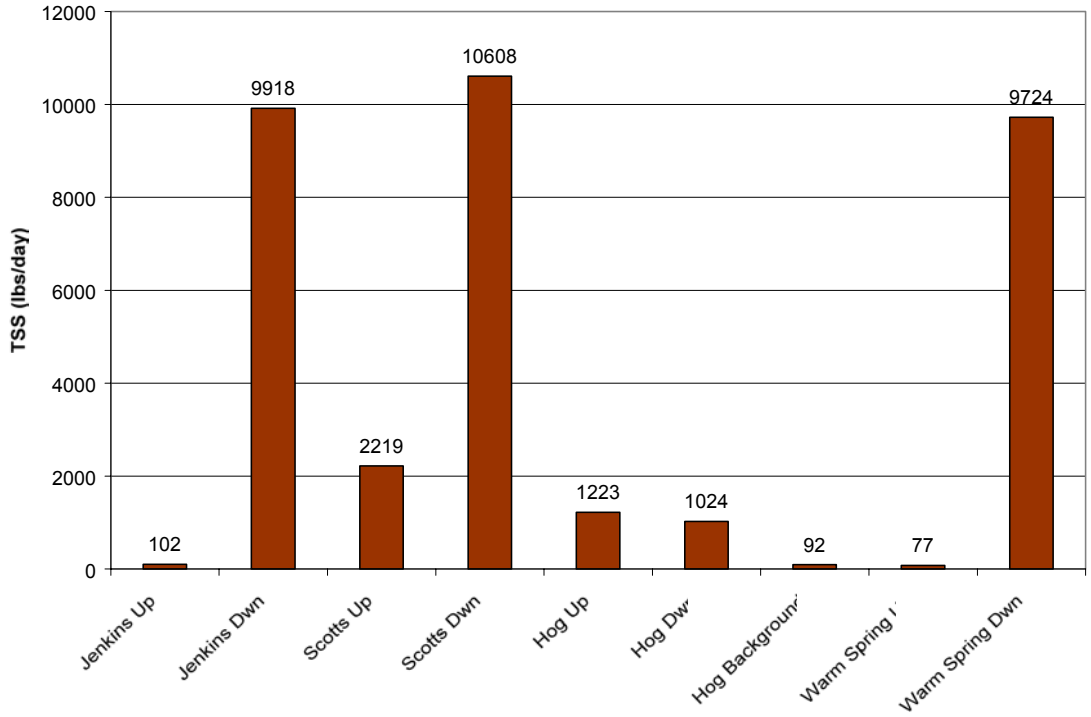

Figure 2. Average Total Suspended Sediment Load (lbs./day)

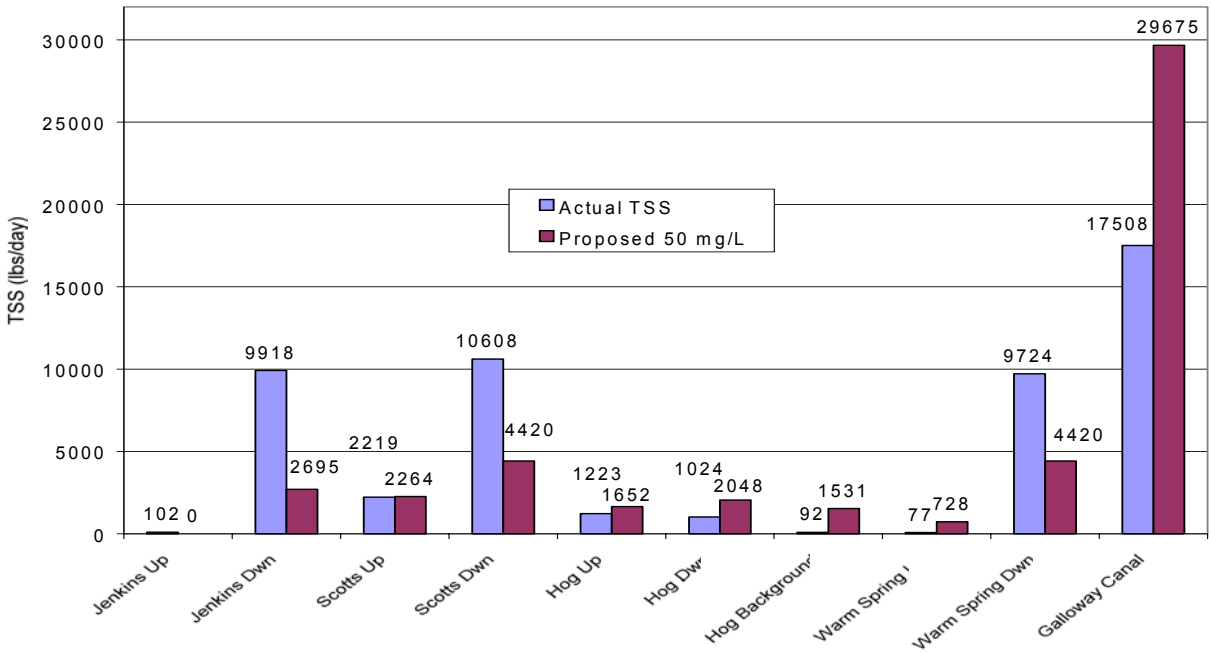

Figure 3. Actual TSS load vs. proposed TSS (50 mg/L)

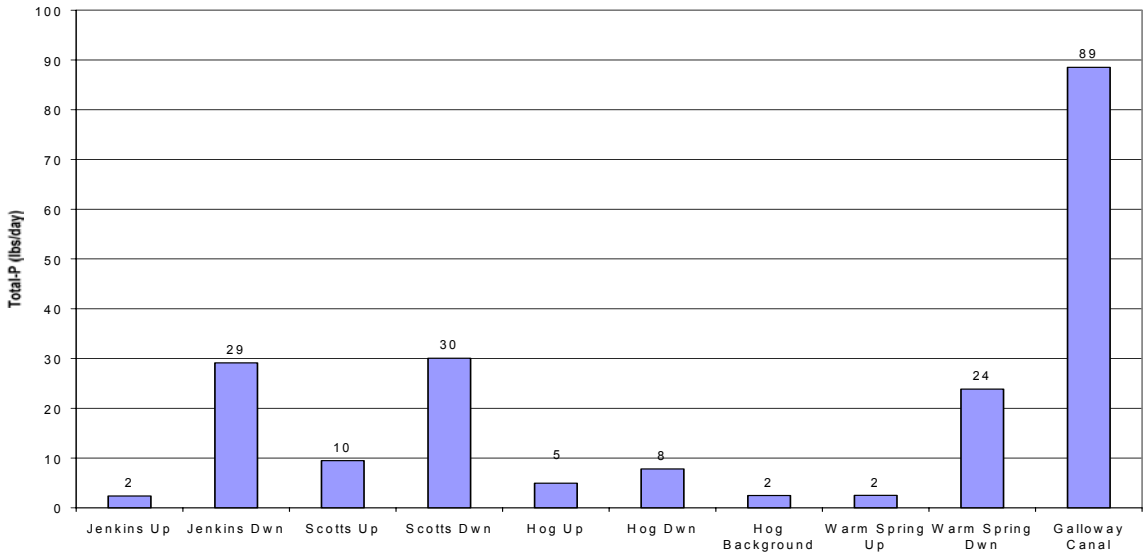

Figure 4. Average load total phosphorus (lbs./day)

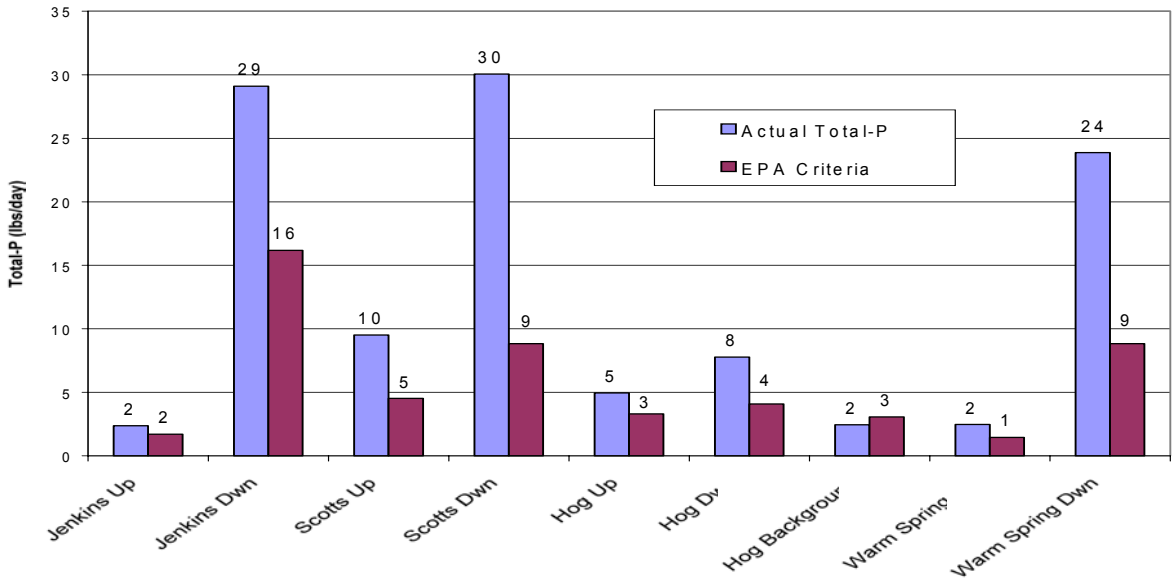

Figure 5. Average load for total-p compared to EPA criteria (0.10 mg/L)

ents for the Hells Canyon Complex TMDL, it is a nutrient that can cause impairment to water quality and induce nuisance aquatic growth. During the study year, the combined load of the four creeks monitored, delivered approximately 339 pounds of NO_3 +NO_2-N to the Snake River daily.

Literature values indicate that NO_3 + NO_2-N should be limited to 0.30 mg/L or less to avoid degradation of water quality (Cline 1973).

Only four sites during this study, Hog Creek Background, (0.06 mg/L), Hog Creek Up (0.24 mg/L), Galloway Canal (0.26 mg/L), and Warm Springs Up (0.27 mg/L) were below the recommended literature value. As compared to the literature value (0.30 mg/L) and Based on measured average discharge rates and calculated mean concentrations from each creek, the largest percent reductions in nitrate would be Scott up (91%), Jenkins down (90%), Scott down (70%) and Warm Springs down (61%) Figure 6. These reductions were computed using a reference literature value of 0.30 mg/L.

Bacteria

The four creeks studied in the Weiser Flats are not listed on the states 303(d) list as

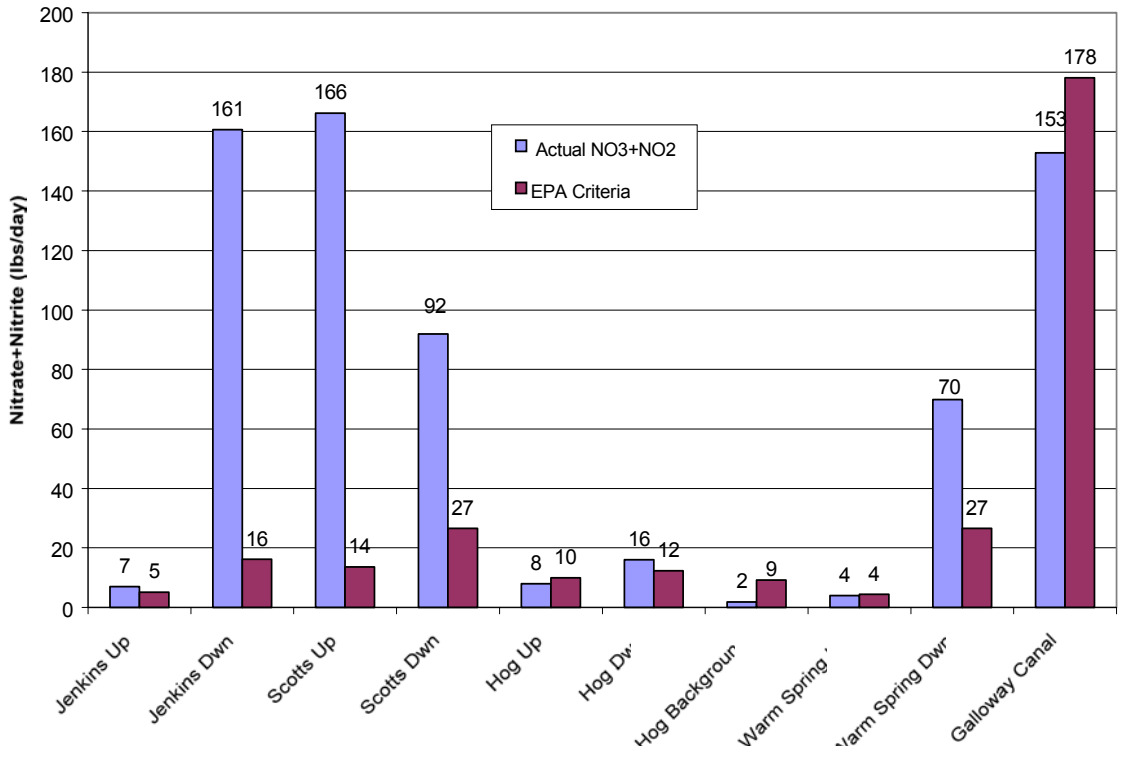

Figure 6. Average load NO_3 + NO_2-N compared to literature value (0.30 mg/L).

having a bacteria problem that impairs their beneficial uses.

During our monitoring program, all four creeks, at times, exceeded the state's water quality guidance for both fecal coliform and escherichia coli (*E. coli*). As of this legislative season (1999-2000) the state's new water quality standard, (IDAPA 58.01.02 sect. 251) for bacteria, is based on *E.coli.* The new standard for *E.coli* is 406 CFUs (colony forming units) detected at any time. This value of 406 CFUs (colony forming units) is the trigger level for additonal sampling (minimum of five samples collected over a 30 day period) to calculate a geometric mean. The new state standard for the *E. coli* geomean is 126 CFUs. Table 1 below indicates exceedances (shaded red) for *E. coli* during this study. The majority of these exceedances occurred from May through August of 1999.

Conclusions

The four creeks located with Weiser Flats all indicate that water quality is impacted by activities within the lower agricultural areas. Although some impacts were noted due to climatic activities (rain, snow, and rain on snow events) the majority of the water quality degradation appears to be caused by anthropogenic activities.

Reductions in total suspended sediment (TSS) and total phosphorus will likely be required to meet the TMDL goals set for the Lower Hells Canyon Complex TMDL. The amount of reduction required for these pollutants will be addressed in the TMDL developed, by IDEQ, for Hog Creek, Scott Creek, and Warm Springs Creek. Although Jenkins Creek is not listed for TMDL development, a load allocation and load reduction goal should be addressed.

Date	Jenkins Down	Jenkins Up	Hog Down	Hog Up	Warm Down	Warm Up	Scott Down	Scott Up	Galloway
4/14/99	60	<20	80	40	100	<20	180		40
4/28/99	180	20	600	130	400	80	400	230	100
5/12/99	180	250	130	150	700	330	200	200	400
5/26/99	530	870	>8300	970	270	900	67	170	200
6/9/99	630	370	3700	770	530	330	430	130	67
6/24/99	1100	400	700	800	850	900	1300	1100	450
7/7/99	750	250	950	200	1100	850	800	350	200
7/22/99	4500	<50	50	500	900	850	400	2800	200
8/3/99	1200	650	300	850	1600	500	2600	750	750
8/18/99	100	50	150	500	100	6200	100	350	200
9/1/99	1200	200	6300	1500	1100	no flow	300	300	900
9/22/99	850	200	150	400	350	no flow	600	150	650
10/6/99	260	100	140	80	200	no flow	320	80	140
10/21/99	40	20	40	480	40	170	320	10	off
11/16/99	<10	<10	10	70	240	20	20	<10	off
12/8/99	<10	20	150	90	no flow	240	10	no flow	off
1/11/00	<10	20	60	20	no flow	30	no flow	no flow	off
2/9/00	10	<10	50	180	no flow	10	no flow	no flow	off
3/15/00	80	10	140	20	no flow	no flow	no flow	no flow	off

Table 1. One time exceedance for *E.Coli*

Average concentrations for TSS exceeded the 50 mg/L standard, developed for the Lower Boise River TMDL, at all of the lower creek stations with the exception of Hog Creek down. The stations located in the upper portion of the watershed showed no exceedance of the 50 mg/L concentration. Using this concentration, the reductions at the lower stations, prior to entering the Snake River, would be as follows: Jenkins Creek (73%), Scott Creek (58%), Warm Springs (55%), and Hog Creek (0%).

Reductions for phosphorus would be required if the reduction values were based on EPA criteria of 0.10 mg/L for streams not discharging directly into a lake or reservoir. The reductions, based on the average phosphorus concentration collected at the lower reach of each creek, are as follows: Scott Creek (70%), Warm Springs (62%), Hog Creek (50%), and Jenkins Creek (45%). Further reductions may be warranted based on the decrease needed to meet the Lower Hells Canyon Complex TMDL.

Recommendations

To determine which current agricultural practices or other impacts are degrading the water quality of these creeks ISDA recommends the following:

- The Weiser SCD should work with the local NRCS, SCC, and ISDA staff to conduct a major inventory of the area and activities within the area.
- Evaluate the stream bank conditions for severe down cutting, sloughing and loss of riparian function.
- Evaluate the irrigation water return systems and try to determine which ones are causing the majority of impacts to the creeks. Evaluate irrigation practices within the Weiser Flat area.
- Assess the impacts if any of large animal operations, either confined or otherwise, and their potential impacts on these systems.
- Try to identify critical areas or critical activities that would be best addressed by implementation of BMPs.
- The SCD, NRCS, SCC and ISDA need to work with landowners and cooperators to seek funding and support that will improve the overall water quality within the watershed.

References

Cline, C., 1973. The effects of forest fertilization of the Tahuya River, Kitsap Pennisula, Washington. Washington State Dept. Ecology. 55p

USEPA. U.S. Environmental Protection Agency. 1987. Quality Criteria for Water. EPA Publication 440/5-86-001. U.S. Gov. Printing Office, Washington D.C.

(IDEQ) Idaho Division of Environmental Quality. 1998. Draft Lower Boise River TMDL, Subbasin Assessment, Total Maximum Daily Loads.